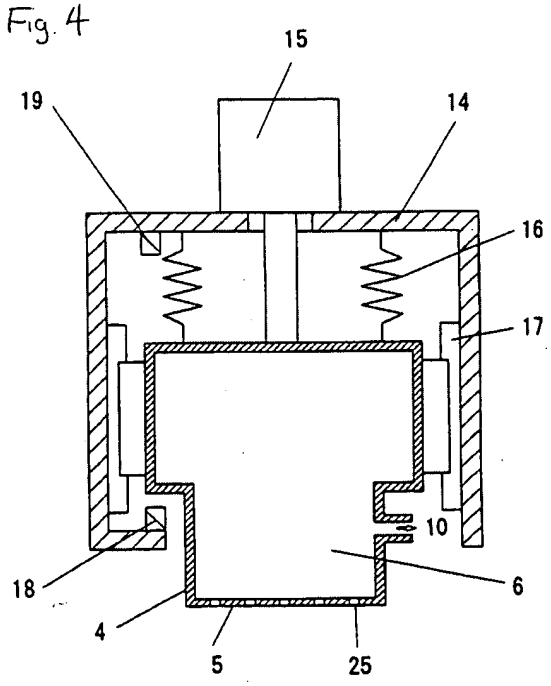
REMARKS

Minor revisions, none including any new matter, are made to the specification.

The application was filed with 13 claims. Those claims were maintained in the application, though substantial revisions were made to the specification in a prior amendment. All of the claims were rejected in the latest Office Action as obvious and unpatentable over either of two references – Sakemi and Nakazato. [1/] Claims 1, 2, 3, 5, and 11 are amended in this paper, and claims 1-13 thus remain pending for examination.

Claim 1 originally required "a clamping device for clamping [a] head in a condition in which [an] energized force generating device stores an energized force." Such a configuration is depicted, *e.g.*, in Fig. 4 of the application, which is reproduced here, at right.

Fig. 4

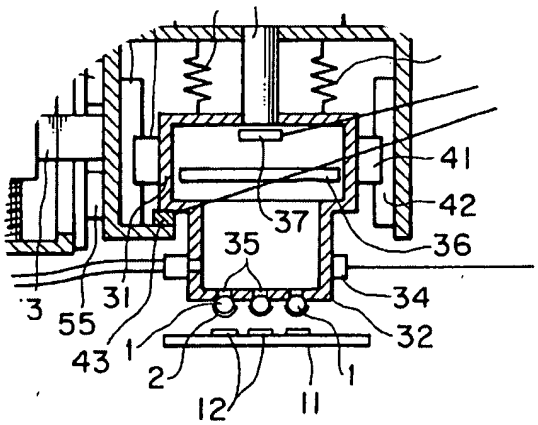


The head 4 includes a downward-facing clamping surface (not separately numbered) configured to engage with a rigid lower positioning stop 18. Moving the head's clamping surface into engagement with the lower positioning stop clamps the head in place against the stop. The system is configured so that energy is stored in springs 16 when the head is clamped against the stop.

[1/] *Office Action* of February 20, 2003, ¶¶ 5 and 6.

The claims were rejected under section 103 as obvious and not patentable over either Sakemi or Nakazato. A portion of Fig. 2 of the Sakemi reference is reproduced here, below.

The assemblies described in Sakemi and Nakazato include vertically movable heads, or cases 31. These cases include a downward-facing engagement surface. In Sakemi and Nakazato, though, the engagement surfaces come into contact not with a rigid stop, but rather with a contact, or "touch" sensor 43.



The Examiner alleges in the most recent Office Action that this structure serves as a clamping device in either of the Sakemi or Nakazato references:

> In Figure 2 (of both references), such a "clamping device" for clamping the head structure is illustrated in each reference by reference numbers 38, 40, and 62 . . . . Both Figure 2's of the 35 USC 103(a) references appear to be substantially the same as the applicant's Figure 4, including the lower stop 18 (discussed on page 2 of the amendment), as this structure also appears as reference number 43 in the Sakemi et al. and Nakazato references. [2]/

Applicant disagrees with the Examiner's assertion that the Nakazato and Sakemi devices are "substantially the same as" the device in the present application. The device in the application includes a rigid structural "stop"; the device in the references includes an electrical position sensor.

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[2]/ *Id.*, ¶ 8.

As now amended, claim 1 requires "a clamping device operable to clamp said head in a condition in which said energized force generating device stores an energized force," and further specifies that:

> said clamping device compris[es] a clamping surface mounted to said head, and a rigid lower positioning stop configured for engagement with the head's clamping surface, *wherein moving the head's clamping surface into engagement with the lower positioning stop clamps the head in a clamped position* in which the force generating device stores an energized force (emphasis supplied).

Neither Sakemi nor Nakazato includes any such "rigid lower positioning stop configured for engagement with the head's clamping surface." The Sakemi and Nakazato's contact sensors cannot be regarded as rigid lower positioning stops.

Nor do Sakemi or Nakazato teach or suggest "moving the head's clamping surface into engagement with the lower positioning stop [to clamp] the head in a clamped position" as claim 1 now requires.

In Sakemi and Nakazato, contact between the case and the contact sensor is plainly not "clamped contact" in which the rigid stop prevents vibration and positively and precisely determines the position of the head. To the contrary, contact between either of the references' case and its contact sensor must be very light pressure, so that the case can move immediately away from the contact sensor upon the solder balls' first contact with the workpiece, to avoid deforming the balls or forcing them too firmly into the openings in the bottom of the case. Sakemi says:

> FIGS. 5a to 5d show the operation of mounting the solder balls 1 in detail, respectively. First, as shown in FIG. 5a, the attracting tool 32 is lowered toward the substrate 11. This downward movement is effected by energizing the motor 56 to rotate forward.
>
> Subsequently, when the solder balls 1 reach the respective electrodes 12 as shown in FIG. 5b, the attracting tool 32 slightly rises with respect to the box 30 due to the reaction while pushing the rod 39 of the cylinder 38 upward in FIG. 2. Accordingly, the underside of the

> case 31 detaches from the touch sensor 43, enabling the detection that the solder balls 1 have been in contact with the electrodes 12. *Upon this detection, the motor 56 stops driving at once to cease the downward movement of the attracting tool 32.*
>
> In the state where the solder ball 1 is in contact with the electrode 12 as shown in FIG. 5b, the downward force caused by the forward rotation of the motor 56 will not act as force pressing the solder ball 1 against the electrode 12. The reason is that when the solder balls 1 land on the electrode 12, the case 31 and the attracting tool 32 rise from the bottom of the box 30 and the downward force developed by the forward rotation of the motor 56 is no longer transmitted to the attracting tool 32. . . . . *Accordingly, by controlling the pushing force of the rod of the cylinder 38, the solder balls 1 can be pressed against the electrodes 12 under such an adequate force as ensuring that the solder balls 1 will not fit into the respective attracting holes 35 or collapse themselves.* [3/]

This is the *only* function either of the patents describes for the touch sensor – halting the motor immediately upon contact of the solder balls with their respective electrodes. Nothing in either reference describes, teaches, or suggests, clamping the case or head against the contact sensor. Doing so would in fact run counter to the very purpose of the configuration the references describe. If the case were clamped firmly against the sensor, the force applied to the balls by the bottom of the case would necessarily be increased, which would thereby increase the danger that the balls would be deformed or forced into the openings on the bottom of the case as the balls were pressed against the workpiece's electrodes. Very light contact – the opposite of "clamping" – is essential to the function described as the purpose of the configurations in either of the two references.

[3/] U.S. Patent No. 5,890,283 (*Sakemi*), column 5, line 54 – column 6, line 25 (emphasis supplied).

Amended claim 1 is thus patentable over the art cited against it. Claims 2, 3, and 4 depend directly from claim 1, and are thus patentable as well.

Independent claim 5 is a method claim. As amended, the claim requires "clamping the head by moving the head into a position in which a clamping surface mounted to the head is engaged with a rigid lower positioning stop." No such rigid lower positioning stop is present in the references, and nothing in the references teaches or suggests clamping the head to such a stop. Indeed, such clamping would run counter to the chief function of the touch sensors in the cited configurations – insuring that the head stops as quickly as possible after the solder balls' first contact with the electrodes. For at least this reason, it would not be obvious, as the Examiner appears to suggest in the latest Office Action [4/] to modify the device described in either of the two references to add a function whereby the head would be "clamped" against the touch sensor. [5/] Amended claim 5 is thus patentable over the art cited against it, as are claims 6-13, which depend from it.

In view of the foregoing, it is respectfully submitted that claims 1-13 and the application as a whole are now in condition for allowance. Reexamination and reconsideration of the application, as amended, are respectfully requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is invited to call the undersigned attorney at the Los Angeles, California telephone number (213) 337-6711 to discuss any steps necessary for placing the application in condition for allowance.

[4/] February 20, 2003 *Office Action*, at ¶¶ 5 and 6 ("one of ordinary skill in the art would have readily used the pressing force controller 62, in cooperation with rod 39 and springs 40, as a clamping means with (potential energy) energized force, such that the pressing force controller 62 is capable of applying a clamping force").

[5/] It is not sufficient, moreover, for the Examiner merely to allege that one of skill in the art *would have been capable* of making this modification. A *prima facie* showing of obviousness requires that the Examiner identify something *in the art itself* that would have suggested to one of skill in the art the desirability of doing so. No such suggestion is present in either of the cited references cited against this application.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,
HOGAN & HARTSON L.L.P.

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